

CLAIMS

1. Rolling apparatus for roller skates users, intended to be used in association with roller skates, notably “quad” type with pairs of parallel wheels or “in line” type with aligned wheels, of the same type of device comprising, in situation of normal use, at high and back extremity two handles (1) directed appreciably in a transversal way regarding the longitudinal axis of the device, intended each one to be held simultaneously and freely in front of the skater (u) by each hand approximately as the height of hips when the arms (b) are folded, the palm of hands being preferably turned towards the ground (5), without stiffness nor constraint regarding the skater (u), to command directly, by displacement or change of orientation or height of its longitudinal axis, the orientation and/or the rotation and/or the swivelling of at least one connection arm (2) prolonging these handles (1) and of a wheel (3) axis (4), connection arm (2) definitely tilted backwards towards the skater (u) and which lower extremity is directly solidarized, or via at least one fork (7) comprising at least one arm, with an axis (4) directed appreciably in a transversal way regarding to the connection arm (2) and supporting at least one wheel (3) of at least 14 cm diameter to which are associated means of braking, this device being intended to roll in the axis (4) of the trajectory (t) of the skater (u) and enabling this last one to take support on the ground (5) and to limit his imbalances,

characterised in what it comprises, in order to present in normal and usual use the wheel (3) maintained on the ground (5) in front of the skater (u) by means of the handles (1) at several dozens of centimetres in front of the roller skates (p) while completely keeping the control of the orientation of the connection arm (2) and of the wheel (3) by means of the aforementioned handles (1), means able to procure an increased inertia to the wheel (3) and/or to the device and an increased adherence of the wheel (3) with the ground (5), to develop a resistance on the one hand to a side skid notably during the propulsion of the legs and on the other hand against a wheel (3) blocking during the braking, to enable respectively

 - to appreciably limit the natural rotation of the shoulders of the skater (u) during the movement of propulsion with the legs, known as “step of skater”, by opposing the wheel (3) resistance to a side skid to which subjects it the couple applied on the handles (1) in the axial plan of the connection arm (2) by the natural movement of rotation of shoulders, which so gets a mobile support relatively resistant to the skater’s arms (b) conferring at the same time a noticeable improvement of its balance and of the effectiveness of the propulsion of his legs by means of the skates resulting in an increased travel rate,
 - to increase the travel rate of the skater (u) by the traction of his body by means of his upper limbs, during movements of more or less big amplitude before back of the arms or of rotation of the wrists using mainly the inertia of the device and/or of the wheel (3), or possibly of pumping movements of the arms simultaneously using the inertia of the device and/or of the wheel (3) and the adherence of the wheel (3), or still possibly of a movement of scull using the adherence and the inertia of the wheel (3),
 - and to prevent during the braking the blocking of the wheel (3) which would cause a skid making lose the effectiveness of braking and the control of the direction, notably if the braking is strong.
2. Rolling apparatus for roller skates users, according to claim 1, characterised in what the distribution of

the weights is such to procure a minimum inertia and adherence to the wheel (3) that it must respect at least one of both the following conditions:

- the weight of the complete wheel (3) must be at least equal to 20 % of the total weight of the basic device devoid of accessories and weights of ballasting (151).

5 - the weight of the bottom of the device including the elements which are located there, notably at least one part of the wheel (3) and possibly the supports of loads accessories or weights of ballasting (151), representing the lower third of the total length of the device held vertically with the connection arm (2) 2 completely deployed, is at least equal to 25 % of the total weight of the device possibly equipped with accessories, with supports of loads (66) or with weights of ballasting (151)

10 3. Rolling apparatus for roller skates users, according to claim 1, characterised in what the connection arm (2) comprises means of boltable folding, such as telescopic and/or articulated elements, so as on the one hand to reduce the bulkiness of the device when it is not used and on the other hand to adjust the length of the aforementioned connection arm (2) according to the size of the skater (u) and in the fact that involving the fork (7), the connection arm (2), and the handlebar (8), two of these elements at least
15 are separable and assembled together by boltable and unboltable means (99, 100, 101) of embedded positive connection offering no degree of freedom in locked position during the use of the device in normal operation, notably in rotation according to the connection axis.

4. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the means of braking comprise at least two systems of active braking (19) acting each one on at least
20 one common or different wheel (3), commanded jointly or distinctly by means such as at least one control lever (18) located on one handle (1), so as to increase appreciably the power and the progressiveness of the braking while ensuring a safety in case of failure of one of them.

5. Rolling apparatus for roller skates users, according to claim 4, characterised in what both braking systems are the same type and are arranged either on both side arms of the fork (7), or according to
25 different radius lengths on the wheel (3) rim, so as to obtain by this simple arrangement a different action and progressiveness one compared to the other.

6. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what means are interposed in at least one zone located between handles (1) and wheel (3) axis (4) to enable to reduce by elastic progressive compression the distance between these two parts of the device during the
30 stages of braking counter means of elastic recall, constituted for example by a connection arm (2) which structure enables a cambering operated in the stage of elastic deformation of the material constituting it, or by interposed shock absorbing elements (150), in order to improve the wheel (3) adherence during the braking by opposing to its separation of the ground (5) by absorption of rebounds caused by the harshness of the ground (5).

7. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what every handle (1) is set up on the device according to an orientation appreciably identical to that of the axis of a piece of tube held freely and enclosed by the corresponding hand while it is forward at the
35 pubis and the hips height at approximately 10-15 cm from the body, the non-folded wrist directed in the natural continuation of the forearm, the arms (b) being folded and the elbows maintained laterally close to the body, the device being in operation position directed so that the angle (158) formed with the
40 ground (5) by a line passing at the wheel (3) axis (4) and by the axis of the handles (1) has a value of

43 ° (+ or - 10 °) approximately in order to the use of the device, the elbows stay close to the body in natural position, and the holding of the handle (1) is ergonomic for the hand, so that this last one applies all around a regular support without undergoing more important and uncomfortable pressure notably concerning the base of the thumb, nor constraining the elbows to deviate from the body.

- 5 8. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the handles (1) are set up swivelling on their longitudinal axis according to at least one fraction of turn, in a free way or related with means of elastic recall, of friction, or of bolting, so as to enable the skater (u) by rotating and successive movements of wrists applied on the handles (1) themselves to procure impulses forwards to the device, which related with the effect of the very inertia to the device procure stages of acceleration by propulsion forwards produced in a different and additional way by the
10 the propulsion obtained by the movement of legs on the skates.
9. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the means enabling to procure an increased inertia and adherence are constituted of means enabling to arrange at least one load (66) either ballasting, or to carry, which weight is largely supported by the
15 the wheel (3) axis (4) to increase its pressure on the ground (5), for example near or on both sides the aplomb of the wheel (3) axis (4), these means being constituted for example of one load -carrier (43) made by a box, a rack or a grid, at least one hook, a ring or a thread or not opening (153), or thread edges enabling to screw weights of ballasting (151) coaxial to the wheel (3) at the extremities of its axis (4).
- 20 10. Rolling apparatus for roller skates users, according to any of the previous claim, characterised in what means enabling to receive at least one load (66) near the aplomb of the wheel (3) axis (4) are set up on the device so as to arrange the gravity centre of the load (66) in front of the aplomb of the wheel (3) axis (4), preferably in a variable and adjustable way, so as to bring closer the gravity centre of the device to the aplomb of the wheel (3) axis (4) by making at least partially counterweight of elements
25 located between the skater (u) and the wheel (3) axis (4), the connection arm (2) and the handlebar (8) notably, so that a part at least of the weight of these elements and the load (66) be supported by the wheel (3) axis (4) to increase its adherence while relieving of it the skater's arms (b)
- 30 11. Rolling apparatus for roller skates users, according to one of claims 9 or 10, characterised in what means enabling to make support an additional load (66) to the wheel (3) axis (4) comprise means of amortization and/or absorption of shocks and vibrations caused either by the irregularities of the ground (5) or by the to and fro movements, so that the load (66) undergoes them very attenuated only, such for example by using a material presenting a certain elasticity in the structure of the load-carrier (43), steel for example, and/or by at least one more or less pronounced curvature, and/or by a cantilevered position with regard to a point of solidarisation at the device obtained for example by a
35 fixation procured by at most two opposite coaxial points of fixation (56) each equipped with means (56, 175) opposing effectively to the rotation of load-carrier (43) around these points of fixation, enabling to obtain during to and fro movements of arms (b) or by swivelling movements of wrists, an increase of the propulsion effect by an effect of expansion of the shock absorbing element related with the inertia of the load (66).
- 40 12. Rolling apparatus for roller skates users, according to one of claims 9 to 11, characterised in what means enabling to make support an additional load (66) to the wheel (3) axis (4) comprise means

enabling to make the load (66) mobile according to the before back axis of movement of the device, either freely according to the movements applied by the skater (u) on the handles (1), such as for example the setting of the load (66) on at least one slide (168) or at least one articulated (166) or elastic (167) arm and preferably related with means of amortization (169) at the front and back end of running, or in an adjustable, controlled and boltable way to adjust the distribution of the weights with regard to the wheel (3) axis (4).

13. Rolling apparatus for roller skates users, according to one of claims 9 to 12, characterised in what the device comprises means of adjustment of slope (60, 61, 156, 171) to and fro and conversely, either of load-carrier (43) with regard to the connection arm (2), or the connection arm (2) with regard to load-carrier (43) enabling to arrange the load (66) appreciably with horizontal during the movement according to the size or the preferences of the skater (u).

14. Rolling apparatus for roller skates users, according to one of claims 9 to 13, characterised in what the load (66)-carrier is equipped with means of vertical boltable retaining (70) by a simple pressure on the load (66) to solidarize it to the load-carrier (43), and unboltable by means of command (57) to disunite the load (66), control lever for example, related with means of lateral (42) and longitudinal (48) retaining of the load (66).

15. Rolling apparatus for roller skates users, according to one of claims 9 to 14, characterised in what the means of support of an additional load (66) is constituted by a seat intended to receive a young child (96), and in what this seat (96) and/or the device comprise means enabling to fix it to the device in directed position either forwards, or backwards the device.

16. Rolling apparatus for roller skates users, according to one of claims 9 to 15, characterised in what the device and/or the child seat (96) and/or the load-carrier (43) comprise means of lateral stabilization (97) coming into contact with the ground (5) when the slope of the loaded wheel (3) reaches a level difficult to control by means of handles (1), so as to oppose to the lateral overbalancing of the device when is loaded, these means of stabilization being equipped at contact with the ground (5) of means of rolling (98) or gliding to soften the contact with the ground (5) when the device is rolling, and preferentially of means of adjustment in length, in height and/or in slope to determine their level of intervention, notably according to the nature and/or to the weight of the load (66), and the muscular force of the skater (u), and means of folding when they are not used, for example by swivelling towards the wheel (3), possibly related with bolting and unbolting means.

17. Rolling apparatus for roller skates users, according to one of claims 9 to 16, characterised in what the load-carrier (43) is constituted directly or not by a basket, by a rack or by a box comprising means of folding on itself to reduce its height, preferably quickly, so as to enable the arrangement of loads (66) freely inside when it is in unfolded position, or outside by arranging and fixing them directly above when it is in folded up position, notably when their dimensions exceed its ones, the folded up position in case of non utilisation improving besides appreciably bulkiness and drag coefficient of the device.

18. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it comprises means enabling to park it in an appreciably vertical position by keeping the wheel (3) on the ground (5), for example at least one kickstand (33) formed by a stalk or by a tube which one or several free extremities (32) take support on the ground (5) when the device is overbalanced forwards, by forming at least two support points with the ground (5) arranged triangular with the contact point of

the wheel (3) with the ground (5), these kickstands (33) being optionally connected together by means (112, 58), such as a bar or a tube, enabling at the same time to stiffen them, to act as bumper, notably to protect the legs of a young child sat in a seat (96) above the wheel (3), and to support at least one accessory of driving or safety such as a headlight or a front light (121).

- 5 19. Rolling apparatus for roller skates users, according to one of any claims 1, 4 and 5, characterised in what it is equipped with means of bolting or blocking of at least one braking organ (19) in working position to immobilize the wheel (3) during the parking, so as to be able to support it up or oblique against any support and in what these means of bolting or blocking are equipped with a means of elastic recall in rest position, for example a hook (37) swivelling set up at least at the free extremity of one
10 handle (1) retaining a control lever (18) of brake (19) command pulled towards the handle (1) in working position, equipped with a spring (38) releasing the control lever (18) from the hook (37) as soon as it is again pulled enough so that the hook (37) releases itself from it.
- 15 20. Rolling apparatus for roller skates users, according to one of any claims 1, 4 , 5, 19, characterised in what the braking command is partially transmitted at least by transmission means of type supple and retractable enabling a reduction of their bulkiness during the "folding" of the device by shrinkage of the connection arm (2) length, and/or an adjustment of their length according to that of the connection arm (2), and/or a adjustment of the length of the telescopic connection arm (2) in a predefined length during its deployment, such as a resistant chain passing preferably inside the connection arm (2), which number of used links predetermines the length of the connection arm (2) to be deployed.
- 20 21. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it comprises means such as fairing (35) or deflector element, spoiler, fixed or folding up, having fixed or variable geometry, presenting a significant surface and an aerodynamic shape adapted to constrain the air sliding on their surface during the movement to apply an additional pressure on the wheel (3) of the device adding to their very weight to increase its adherence, while improving the aerodynamic
25 shape of the device and the skater (u).
22. Rolling apparatus for roller skates users, according to claim 21, characterised in what the means constraining the air to apply a pressure on the wheel (3) of the device during the movement are equipped with means of adjustment in position enabling to adjust their height and/or their vertical and horizontal slope and/or their width, or their slope around the wheel (3) axis (4), notably according to the
30 skater's size (u) and the angular orientation of the device.
23. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it moreover comprises means enabling to hang it in an appreciably vertical position, either with any free support to park it or array it, for example a ring (28) or a hook arranged in its longitudinal axis (4) near handles (1) or handlebar (8) over its gravity centre in vertical position, or with an outside fixed element
35 by introducing a padlock cable through a ring solidarized with the body of the device, or with a mobile object such a supermarket carriage, notably at the top of its front face (105), for example an opened hook (20) arranged preferentially about the middle of the connection arm (2) and solidarized to this one over the gravity centre when the device is in vertical position.
- 40 24. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it moreover comprises means enabling it to easily jump over kerb without any shock, themselves constituting a means of ballasting suitable to increase the inertia and the adherence, for example

constituted by a device of type skate comprising an rectangular, lengthened and relatively narrow board, arranged longitudinally in the axis and fore the wheel (3) of the device, sidelong regarding to the ground (5), which superior foremost extremity is preferentially bent back upward as ski spatula and fixed at the device by elastic or not means of connection (26), and which lower extremity is close to the wheel (3) and located at a few centimetres from the ground (5).

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25. Rolling apparatus for roller skates users, according to the previous claim, characterised in what the device and/or the means enabling it to jump over easily and without shock kerb comprises means of declutching (24, 25, 26, 31) of the jumping device, notably to enable the parking of the device in an appreciably vertical position with the connection arm (2) overbalanced ahead the aplomb of the wheel (3) axis (4).

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26. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the braking means are constituted by means of recovery of energy from the wheel (3), themselves constituting a means of ballasting suitable to increase the inertia and the adherence, transforming the kinetic energy of the whole device - skater partially into mechanical, electric, electromagnetic energy, or pneumatic simultaneously stored inside means of stocking such as respectively a spring, a battery of electric accumulators or a tank of compressed air for example, together with means of releasing of the said energy, and in what the aforementioned braking organ is reversible and uses the energy when it is released to propel the wheel (3).

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27. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it besides comprises at least one propulsion organ of the wheel (3) constituting itself a means of ballasting (151) suitable to increase the inertia and the adherence, and by means of command intended to be activated by at least one skater's hand (b), constituted by autonomous motorized means for example located in the hub of the wheel (3), moved by a source of energy independent of type fuel in a tank, or of type electricity contained in a battery, the aforementioned means of stocking being arranged either near the wheel (3) or in a way appreciably balanced regarding to the wheel (3) axis (4) aplomb so that the main part of their weight is supported by the wheel (3) axis (4), for example against the outside or inside at least one of the fork (7) arms, or preferably in an adjustable way to and fro ahead the aplomb of the wheel (3) axis (4), for example between kickstands.

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DESCRIPTIVE SUMMARY

Figure for the summary: figure 1

- 5 Rolling apparatus for users of roller skates, independent from these last ones, comprising in the high extremity two handles (1) set up separate, side by side or spaced by a handlebar (8), each one intended to be simultaneously held by each skater's hand and to control the orientation of at least one connection arm (2) prolonging them directly or via a handlebar (8), which lower extremity is directly solidarized, or via a fork (7) comprising at least one arm, in the axis (4) of at least one wheel (3) equipped with a sure inertia and with a
- 10 tyre equipped with a tread (6) intended to roll on the ground (5) at some dozens of centimetres ahead skates, presenting a strong adherence obtained notably by increasing its pressure on the ground (5) by making it support the weight of different and useful loads arranged near the aplomb of its axis (4) and preferably ahead this one to make counterweight of the connection arm (2) and handlebar (8) supported partially by the skater's arms, so that the device appreciably improves the progression of the skater by the traction of his body by means
- 15 of his arms and by the economy of an energy dissipated in the useless rotation of his shoulders, ensures an extremely powerful braking, and protects imbalances.
- The invention is likely for industrial applications in sport, leisure activities and non-polluting conveyance, as well individual as utilities type.

OBSERVATIONS about under Article 19 claims

All claims were altered and reformulated according to the four documents quoted in the research report. Some have disappeared, others have been subdivided.

I wish to supplement these new claims by the following observations, where the former numbering is reminded in brackets when it is different:

C1: the purpose sought by the quoted patents is totally different from that wanted by the present application. They only aim at a use by motorized propulsion of the user and exclusively concern automotive tractors devices, where the wheel adherence is sought as described only for its motricity. The user is always pulled, and he undergoes only the device traction, so that the data, the constraints and the purpose to be reached are radically different.

Two of them which comprise two wheels and two axes, are even excluded from the sphere of the present application, so different the constraints and the behaviours are regarding the present configuration with unique wheel and axis. Moreover these two-wheeled vehicles constitute power-driven cycles within the meaning French traffic rules (article R311-1), which is not the case of the device of the present application which, having one wheel only, does not correspond to the definition of a cycle.

The reduction of the imbalances is only secondary and hardly evoked, and there are not really means implemented to reach that purpose. It does not constitute one of the purposes sought by these inventions.

And in every case, the presence of a second wheel, whether it is on same axis or on another one, does not enable to obtain the sought effect, notably by forbidding edge grips of the wheel got by effect of scull.

On the contrary, the present application only concerns a device pushed by the skater, either deprived of motorized means, or equipped with such means when they are not used. Indeed, the motorized devices often have a short autonomy, especially when they are electric and heavy, notably because ballasting weights useful for their motricity. The interest is thus to use the engine only in painful situations, ascents or wind facing for example. But the profit obtained in the ascents mustn't be lost at once in other situations due to a heavy and handicapping device.

It is thus necessary to find ways to make it much more mobile and manoeuvrable than those described, notably by saving weight. It can so comprise only reduced motorized and energy means, especially when it concerns electric batteries.

It is one of the main purposes sought and reached by this invention that is improving the propulsion without using an engine, even having one at hand. That means how the invention is interesting by enabling to really obtain this unexpected and not evident effect when the claim 1 conditions are met.

Indeed, it is not obvious for The Art Man to make a skater push a rolling device constituting a load in front of him, to make him climb an ascent faster than if he had his free hands.

The absence of use of motorized means is never evoked in any of the 4 patents, even in case of breakdown energy, which lets suppose that they are not conceived for that and they have then no more interest. They even seem to be difficult to use without using the engine.

On the contrary, the device of the present application shows notably all its interest at this moment.

Furthermore, by proceeding like a funambulist pendulum, the device also prevents from almost the totality of falls due to imbalances. This effect which is for its biggest part obtained by the wheel inertia, is not or little obtained by devices described in the quoted patents when their motorized means are disconnected or not used.

No means is indeed described to increase inertia and wheel gyroscopic effect which is not at all one of the objectives of these devices. Besides, because of the low wheel diameter in Harvey patent or wheels in Sinclair patent, the inertia obtained without use of engine can be only very reduced. No description is made of the interest of a good wheel adherence but its motricity obtained only by the action of the motorized means.

The purpose sought and reached by the present invention thus resolves a real problem which had not been so far, by proposing a useful and portable general-purpose device in all conditions, definitely less heavy and cumbersome thanks to its surprising propulsion capacity without use of motorized means, which multiplies its uses, its means and range, and its functionalities with regard to those of the quoted devices.

Both sought effects and means implemented to reach them are described, evoked or arouse in none of quoted patents.

For example, the handles and the connection arm do not participate in any way in the propulsion in the quoted patents. The length of one or several arms is not moreover described and seems to be indifferent. Only Timm patent describes a height pre-adjustable, but variable as its length during the use. These means only aim at the shocks amortization when starting up and braking, not at procuring an increased adherence for the wheel during the propulsion. And without the use of the motorized means, this function is not interesting and does not enable the user to improve his traction, nor to reduce his imbalances. More on the contrary, because the elongation of the steering column delays the intervention of the wheel inertia, giving a saving pendulum effect.

As all the described devices are very heavy due to engines and embarked energies, they have no problems of adherence when braking, and the angle of inclination of the device to the ground is indifferent. Moreover it is never described.

These data are fundamentally different from the present application where the device only requires minimum weight approximately 3 kg to reach the desired purpose. That opposes the wheel adherence needs during braking. To obtain a sufficient adherence when braking, the angle of inclination of the device must be significant. But if it is too big, the skater tends to overbalance above the handlebar. On the other hand, to obtain the propulsion by the effects of the wheel on the ground, the angle of inclination has on the contrary to be weak. The regulation of this angle, which must not change during use contrary to TIMM patent, is thus essential to obtain and associate maximum of both these effects.

During the braking in TIMM patent, the weight supported by the back wheel counterbalances the couple produced to the steering column, and the user is not thrown forward. That cannot be the case in the present application where there is only one single wheel already supporting almost totality of the device weight.

We thus see that it is difficult to compare these devices which are no more in the same sphere than a car and a two-wheeled vehicle.

On the other hand, the pre-regulation of the connection arm length and its bolting in position enables to obtain a similar result with a single wheel, by transfer of a part of the skater's weight to the wheel axis. With the sought angle according to the weight of the load and the device, the beginning of braking indeed operates at once this transfer, which increases gradually the adherence of the wheel, and proportionally to the intensity of braking. If the angle of inclination is too weak, the adherence is weak also and the wheel blocks and slides on the ground without any weight transfer can be made and the braking can have no efficiency.

C2 (Ex 3): no document was quoted.

C3 (Ex C4): These means are described in none of the quoted documents. In each one, there is only a single brake of type brake, even in presence of two wheels.

It is not evident for The Art Man to put on the same wheel two brakes of type brake either from the same type, or from a different type, to obtain an increased safety, a stronger power, a different progressiveness, a bigger progressiveness by an alternative then simultaneous use, a decrease of the response time when brakes are subjected to harmful action of rain, an easy use of the commands for right-handed as well as for left-handed persons, and a conformity of the device to the French Traffic rules.

So much as no monowheel, unicycle or even cycle showing this characteristic whose results are worthwhile yet, not even those of the quoted documents which are subjected to the same problems about that. This characteristic enabling to reach all the sought purposes by being new and not evident for the Art Man seems patentable to me.

C4 (Ex C5): no document was quoted.

C5 (Ex C6): Timm patent was quoted. However, behaviour when braking is not the same as explained in C1 because of having two wheels and two axes.

The claimed means are different from those described in Timm patent, and furthermore, the amortization amplitude is definitely more reduced, the searched purpose not being completely the same because of the very different constraints at first.

C6 (Ex C7): The 4 documents were quoted but none describes an orientation of the handles similar to that claimed. On the contrary, drawings of Timm patent even emerge that handles are aligned on a straight bar. And in Harvey patent, figure 1 shows an orientation of wheelbarrows-type very different from that claimed.

In fact, the orientation of handles indeed has little importance on only towing devices, because they succeed

without any trouble to pull the user practically whatever the orientation of handles is. It is not the same thing for the present application where the orientation of handles plays a major part, even if not necessary, to make the indispensable and optimum movements to the edge grips of the wheel.

We cannot as well compare with the orientation of the handles of handlebar of bicycles or other cycles (scooters), the position of arms and hands being different, and their handlebar being set up on a steering column having a weak play angle, whereas it is notably marked on the device of the present application.

C7 (Ex C8): In the 3 quoted documents, is only described a single rotating handle on both, and only to command acceleration of an engine. In the present application, it is necessary that both handles are to reach the sought purpose, which is totally different, and that independently of any action on a prospective engine. The use of a single rotating handle such as described in the 3 quoted patents does not enable in any case to reach the sought purpose of the present application device.

C8 (Ex C9): The 4 documents were quoted. But I found only in Sinclair and Timm patents the description and the illustration of ballasting weights, and only in Sinclair patent the description and the illustration of means to support them. It is only about ballasting weights having only the purely technical role to increase the wheel motricity.

In Harvey patent, no means are described to support loads or ballasting weights. Only the chassis supports in a permanent way indispensable batteries for the engine functioning. In Towler patent, there also are only batteries.

There is not any notion of occasional loads carrying in utilitarian purpose in none of the quoted patents. However, it is important to distinguish the means to carry permanent and functional loads (batteries and quoted ballasting weights) and loads in utilitarian purpose.

Contrary to the quoted patents, the device of the present application which obtains its results only by the skater's propulsion alone, obtains the required adherence by other means that of commonplace dead weights requiring a wasting of energy to be moved, and satisfies so in a superior way by a combination of means to this function, to which a utilitarian function adds besides.

The claimed means enable to resolve all the difficulties related to the very varied shapes and dimensions by various fixed carrying non-containing elements and by removable containing elements which type, capacity, shape and characteristics are chosen according to the objects to be transported.

None of the quoted patents describes such an arrangement containing at the same time fixed and removable portage means enabling carrying of all kinds of things different from simple ballasting weights or batteries necessary for the functioning of the device.

In the Sinclair patent, the receptacle is a carrying and containing means which can receive up to the skater himself and it is not removable: It seems to be a part of the device to which it is fixed, as the drawings show it. Only the weight ballasting is described as removable (« removable ballast tray » and not « ballast removable tray »). Its removable character only aims at facilitating portage of the device and accessibility to the reservoir located below, but in reality, this ballasting weight is thought to stay in quasi-permanence on the device to ensure a good motricity to it. But it constitutes a very big handicap to use the device without using its motorized means.

In Timm patent, only weights of ballasting are described to improve the wheel auto-motricity, not any means to support them.

The constraints are not the same for occasional loads which shapes, weights and dimensions are very variable, which only the device of the present application suggests to carry in a secondary and not permanent way.

C9 (Ex C14): Sinclair patent was quoted but I found inside neither description of means of vertical retaining, nor even means of lateral and longitudinal retaining of the load. Only means of lateral and longitudinal retaining appear on the drawings, but they are not related with vertical retaining means. Thenceforth, I do not understand why they are quoted in category X.

The means henceforth claimed are not described in any of the 4 patents of the research report.

C10 (Ex C 17): I do not find any trace in quoted Sinclair patent of folding means on itself of the receptacle of ballasting loads.

That is true that folding on themselves racks were conceived, but that is to resolve bulkiness problem, not aerodynamism ones, nor to carry loads when they are folded up. It is not thus obvious for the Art Man to use them in these purposes, and they have not been apparently used so far, notably on cycles or unicycles.

C11 (Ex C10): no document was quoted.

C12 (Ex C11): I found no description or analogy of the means claimed in the quoted Sinclair patent. The very briefly described receptacle 42 states no means of amortization.

Timm patent as for it describes means of amortization, but only about the articulated steering column. I found neither the description of means to carry the load 14, nor a fortiori means of amortization of such means. It is not either described means of amortization of the batteries support where the loads 14 are positioned on drawings.

The described shock absorbing means of the steering column are not any with regards to the shock absorbing means of this application aiming that the means enabling to support loads, the load-carrier notably, with regard to the device and/or the ground. Those of Timm patent only weaken the to and fro movements of the device according to the skater, and not those of the load according to the device or to the ground.

C13 (Ex 12): I found neither description nor analogy of the means claimed in quoted Sinclair and Harvey patents. In Sinclair patent, no means are described to make mobile the ballasting weight 40 with regard to the device, no more than in Harvey patent in which only loads are batteries not seeming mobile with regard to the frame to which they are fixed.

Furthermore, Harvey and Sinclair patents search a location of the gravity centre at level of the wheel axis. Other devices, which have two wheels on two axes, locate it between both wheels. None of them thus describes means to place the gravity centre behind the wheel axis as the present application makes it.

C14 (Ex C15subdivided): no document was quoted.

C15 (Subdivided): no document was quoted.

C16 (Subdivided): no document was quoted.

C17 (ex C16 subdivided): no document was quoted.

C18: no document was quoted.

C19: no document was quoted.

C20: 3 patents were quoted, but I found inside them no description of means similar to those claimed, nor even in two of them a description of transmission means of the braking command, even not in the drawings.

Only Towler patent describes flexible transmission means, but which are not retractable, concerning classic brake scabbards and cables which cannot retract their length during the folding up of a telescopic tube, when they are inside it.

C21: 2 patents were quoted, but the engine bonnets which are described there are a rather reduced surface and do not notably enable to improve the aerodynamism of the user very appreciably as the claimed means make it, nor to apply a significant pressure on the wheel by the moving air support.

C22: The application was reduced to consider the adjustment in slope of the engine bonnet of Harvey patent, although it is not about means claimed at C21.

C23: no document was quoted. This claim was however completed to add the creative activity which was missing.

C24: I found no description or analogy of the means claimed in quoted Timm, Sinclair and Harvey patents. No means of jumping over kerbs is either described there or illustrated. On drawings, front profile of the engine bonnet of figure 3 of Sinclair patent could vaguely look like the jumping over device deflector of the present application, but that is not the case. It concerns ventilation grille of engine which has none of the characteristics required to enable to face the superior edge of a kerb to glide above with run-up. The mechanical strength of the engine bonnet would not be enough for that, and the remoteness of one or more back wheels would not enable to reach the sought purpose.

These observations are still more obvious on the one hand for Harvey patent on figure 3 where the front profile of the engine bonnet is adapted in no way, and the wheel located much too far behind, and on the other hand for Timm patent where nothing looks like a device of jumping over kerbs with a close look or from afar.

C25: no document was quoted.

C26: The 4 patents were quoted, but I did not find in any of them the description of means similar to those claimed.

C27: So reformulated, the means of this claim are not described in any of the 4 quoted patents. The described and illustrated engines are every time outside of one or more wheels, as well as their transmission means (chain, pebbles, and belt).

In the present application, the position of the engine and its transmission inside the hub of the wheel confers to this last one much more weight and inertia, which enables to satisfy completely the means claimed in C1.

The gyroscopic effect is even strongly amplified without using the engine, which besides confers to the device a remarkable balance on its unique wheel, even when it is strongly weighed by occasional loads over its wheel, which appreciably raises its gravity centre that can be then placed higher than in any quoted patents because of the superior diameter of its wheel.

Under Article 19 CLAIMS

1. Rolling apparatus for roller skates users, intended to be used in association with roller skates, notably "quad" type with pairs of parallel wheels or "in line" type with aligned wheels, of the same type of device comprising, in situation of normal use, two handles (1) at high and back extremity, which are preferably directed appreciably in a transversal way regarding the longitudinal device axis, each one intended to be held simultaneously and freely in front of the skater(u) by each hand approximately at hips height when the arms (b) are folded, the palm of hands being preferably turned towards the ground, without stiffness nor constraint regarding the skater (u), to control directly, by displacement or change of orientation or height of its longitudinal axis, the orientation and/or the rotation and/or the swivelling of at least one connection arm (2) prolonging these handles (1), which are symmetrical to it, and of a wheel (3) axis (4), the latter connection arm (2) being symmetrical to the median wheel (3) plan perpendicular to its axis (4), and definitely tilted backwards towards the skater (u), which lower extremity is directly solidarized, or via at least one fork (7) comprising at least one arm, with a single axis (4) supporting a single wheel (3) of at least 14 cm diameter and related with means of braking (19), such a device, being likely to use ballasting weights to improve the wheel motricity, using in normal and common use the wheel (3) pulled on the ground (5) by the skater (u) by means of handles (1) in the axis of his trajectory, at several dozens of centimetres in front of the roller skates (p) while completely keeping the control of the orientation of the connection arm (2) and of the wheel (3) by means of the aforementioned handles (1),

characterised in what it comprises, in order to increase the amplitude of the effect of the own propulsion of the skater (u) without using any motorised means, preventing at the same time almost all imbalances and falls, means able to give increased inertia to the wheel (3), and/or gyroscopic effect, and/or adherence on the ground (5), and in what the distribution of the weights of the devise is such as the weight of the complete wheel (3) is at least 20 % of the total weight of the basic device, so that to develop a resistance of the wheel (3) on the one hand to a lateral scud to increase the roller skates (p) propulsion thanks to a better pulling when using the edge grips and to obtain a traction of the device by effect of scull by taking edge grips with the wheel (3), and on the other hand to a blocking when braking, and in what it is equipped with adjustment means enabling to pre-adjust the angle (158) from the ground (5) by a line going through the wheel (3) axis (4) and the handle axis (1) to the value desired by the skater (u) in order to obtain the most of the aforementioned effects, and means of bolting of this adjustment (11, 12) maintaining during the use of the device this angle (158) at this value which is 43° (+ or - 10°) when the skater's hands (u) are located at level of his hips.
2. Rolling apparatus for roller skates users, according the claim 1, characterised in what the adjustment means of the angle (158) at the desired value comprise at least one telescopic connection arm (2) composed of a male tube sliding inside a female tube, and in what the bolting means of this adjustment comprise a clamping band (11) deformable by the effect of a lever with eccentric (12) pressing the split extremity of the female tube against the body of the male tube to ensure at the same time that both tubes are blocked in the desired position, and that they are freed to be brought by sliding to this position, and are preferably used with automatic pin (17) going through, by a spring effect, permanently inside an opening made close to the sliding extremity of the male tube, as well as when coincident into one of the

openings perforated in line in the female tube, so that to secure the relative position of the tubes in case of unwanted unbolting of the clamping band (11) mostly when braking.

3. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the means of braking comprise at least two systems of active braking (19) of "brake" type, both acting on the same wheel (3), controlled jointly or distinctly by means such as at least one control lever (18) located on at least one handle (1).
4. Rolling apparatus for roller skates users, according to claim 4, characterised in what both brakes are the same type and are arranged either on both side arms of the fork (7), or according to different radius lengths on the wheel (3) rim, or combining both these arrangements, so as to obtain by this simple arrangement a different power and progressiveness one compared to the other.
5. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what means are interposed in at least one zone located between handles (1) and wheel (3) axis (4) to enable to reduce by elastic progressive compression the distance between these two parts of the device during the stages of braking counter means of elastic recall, these means being constituted by a connection arm (2) which section and the material enable a slight cambering operated in the stage of elastic deformation of the material constituting it, or by shock absorbing element (150) interposed in the axis of the connexion arm (2) and working in the same axis by compression or elastic expansion.
6. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what when the device is tilted such as the angle (158) from the ground (5) by a line going through the wheel (3) axis (4) and the handle (1) axis has a value of approximately 43° (+ or $- 10^{\circ}$), the axis of each handle (1) has according to an orientation appreciably corresponding to that of a tube enclosed by the corresponding hand when it is forward at the pubis and the hips height at approximately 10-15 cm from the skater's body (u), the non-folded wrist directed in the natural continuation of the forearm, the arms (b) being folded and the elbows maintained laterally close to the body.
7. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what both handles (1) are set up swivelling on their longitudinal axis according to at least one fraction of turn, in a free way or related with means of elastic recall or of friction in order to exclusively enable the skater (u), by rotating and successive movements of wrists applied on the handles (1) themselves, to procure to the device impulses forwards, which related with the effect of the very inertia of the device, procures stages of acceleration by propulsion forwards produced in a different and additional way of the propulsion obtained by the movement of legs on the skates (p) and without using prospective motorised means.
8. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the means enabling to procure an increased adherence to the wheel (3) constituted of means enabling to carry, in a non permanent way, varied occasional loads (66) such as goods, personal things, luggage, parcels, post mails, commodities, music instruments, equipment, are characterised in what they comprise to adapt to the various shapes and dimensions of loads (66), carrying non containing means (43) solidarized to the device, as well as removable containing means which can be solidarized to the carrying non containing means to put loads (66) inside it, the carrying means and containing means being arranged on the device so that the major part of the occasional load (66) weight is supported by the wheel (3) axis (4).

9. Rolling apparatus for roller skates users, according to the previous claim, characterised in what the carrying non containing means (43) are equipped with means of vertical boltable (70) retaining by a simple pressure on the removable containing means or on the contained load (66) to solidarize it to the carrying means (43), and unboltable by means of control (57) to disunite the load (66) contained in the containing means.
10. Rolling apparatus for roller skates users, according to one of claims 8 or 9, characterised in what the containing means comprise means of folding on themselves enabling to reduce their height, so as when they are folded up on the one hand to improve the drag coefficient of the device, and on the other hand to fix directly over them the loads (66) which dimensions exceed their internal dimensions.
11. Rolling apparatus for roller skates users, according to any of claims 8 to 10, characterised in what the means enabling to procure an increased adherence to the wheel (3), of the same type of means enabling to carry loads (66) are placed on the device so as to arrange the gravity centre of the load (66) in front of the aplomb of the wheel (3) axis (4), in a variable and adjustable way to place the gravity centre of the device backwards the wheel (3) axis (4).
12. Rolling apparatus for roller skates users, according to any of claims 8 to 11, characterised in what the means enabling to procure an increased adherence to the wheel (3), of the same type of means constituted of means enabling to transport loads (66), comprise means of amortization and/or absorption of shocks and vibrations caused to the load (66) by the irregularities of the ground (5) and/or by the forward to backward movements, and backward to forward, enabling to obtain during the to and fro movements of arms or swivelling movements of wrists, an increase of the propulsion effect by an effect of expansion of the shock absorbing element (150) related with the inertia of the load (66).
13. Rolling apparatus for roller skates users, according to any of claims 8 to 12, characterised in what the means enabling to procure an increased adherence to the wheel (3), of the same type of means constituted of means enabling to carry loads (66), comprise means enabling to make the load mobile according to the device with regard to the before back axis of movement of the device, either freely according to the movements applied by the skater (u) on the handles (1), or in an adjustable, controllable and boltable way to place the gravity centre of the device backwards the wheel (3) axis (4).
14. Rolling apparatus for roller skates users, according to any of claim 8 to 13, characterised in what the means enabling to procure an increased adherence to the wheel (3), of the same type of means constituted of means enabling to transport loads (66), are constituted of a seat (96) intended to receive a sat young child.
15. Rolling apparatus for roller skates users, according to the previous claim, characterised in what the child seat (96) and/or its carrying support (43) and/or the device comprise means enabling to solidarize it to the device in an oriented position either forwards or backwards of the device.
16. Rolling apparatus for roller skates users, according to any of claims 8 to 15, characterised in what the device and/or the means enabling to carry loads (66), for example constituted by a child seat (96), comprise means of lateral stabilization (97) coming into contact with the ground (5) when the slope of the loaded wheel (3) reaches a level difficult to control by means of handles (1), so as to oppose to the lateral overbalancing of the device when is loaded, these means of stabilization being equipped, at contact with the ground (5), with means of rolling (98) or gliding to soften the contact with the ground (5) when the device is rolling.

17. Rolling apparatus for roller skates users, according to the previous claim, characterised in what the means of lateral stabilization (97) comprise means of adjustment in length, in height and/or in slope to pre-adjust their level of intervention, notably according to the nature and/or to the weight of the load (66), and the muscular force of the skater (u), and/or means of folding by swivelling towards the wheel (3) when they are not used, related with bolting and unbolting means.
18. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it comprises means enabling to park it in a rather vertical position keeping the wheel (3) on the ground (5).
19. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it is besides equipped with means of bolting or blocking of at least one braking organ (19) in working position to immobilize the wheel (3) during the parking, preferably related with means of elastic recall in rest position.
20. Rolling apparatus for roller skates users, according to any of claims 1, 4, 5, 19, characterised in what the braking control is at least partially transmitted by transmission means of type supple as well as retractable and/or compressible in length enabling a reduction of their bulkiness during the "folding" of the device by shrinkage of the connection arm (2) length, and/or an adjustment of their length according to that of the connection arm (2), and/or a adjustment of the length of the telescopic connection arm (2) during its deployment to a predefined length by retractable transmission means.
21. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it comprises means presenting a significant surface and an aerodynamic shape adapted on the one hand to improve very appreciably the aerodynamism of the skater (u) as well as that of the device, and on the other hand to constraint the air sliding on the surface of the aforementioned means during the movement, to apply an additional pressure on the wheel (3) adding to their very weight to increase its adherence.
22. Rolling apparatus for roller skates users, according to claim 21, characterised in what the means constraining the air to apply a pressure on the wheel (3) of the device during the movement are equipped with means of adjustment in position enabling to modify their geometry, and/or to adjust their height and/or their width according to the skater's height and width (u).
23. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it moreover comprises means enabling to hang it in an appreciably vertical position, arranged in its longitudinal axis near the handles (1) or the handlebar (8) over its gravity centre in vertical position, either to any free support to park or to array it, or to an outside fixed element by introducing a padlock cable through at least one ring solidarized with the body of the device, or an object, or at the top edge (105) of a supermarket carriage, to keep it with oneself making his shopping, these means consisting in this case in a semi-elliptic opened hook (20) arranged on the connection arm (2) over the gravity centre of the device when this last one is in vertical position, not to it overbalances, and solidarized to this one by screws (55), its opening being parallel to the median plan of the wheel (3) perpendicular to the axis (4) of this one, so that this latter flattens against the carriage, and the external edges of the hook (20) having a tilted profile according to the connection arm (2) axis widening the opening, so that to facilitate the hanging at the edge (105) of the carriage and so that the device weight systematically flattens it against the carriage whatever the diameter of the wire constituting the carriage edge, which

prevents any clearance generating movements, frictions and inopportune banging when the carriage moves.

24. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what it moreover comprises means of easy jumping over kerb without any shock in the continuity of the trajectory (t), making no stop nor strong slowing down, these means themselves constituting a means enabling to increase the adherence of the wheel (3) by a very advanced position of their weight according to the wheel (3) axis (4).
25. Rolling apparatus for roller skates users, according to the previous claim, characterised in what the device and/or the means of jumping over kerbs comprises means of declutching (24, 25, 26, 31) of the jumping device, notably to enable the parking of the device in position appreciably vertical, notably when the connection arm (2) is overbalanced ahead the aplomb of the wheel (3) axis (4).
26. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the braking means are constituted by recovery means of energy from the wheel (3), transforming the kinetic energy of the whole device - skater partially into mechanical, electric, electromagnetic energy, or pneumatic simultaneously stored inside means of stocking, together with means of releasing of the said energy, and in what the aforementioned braking organ is reversible and uses the energy when it is released to propel the wheel (3), these means of recovery, stocking and reusability of energy themselves constituting a means enabling to increase the wheel (3) adherence by their very weight.
27. Rolling apparatus for roller skates users, according to any of the previous claims, characterised in what the means enabling to procure an inertia and/or an increased gyroscopic, and/or adherence to the wheel (3), are constituted of an independent motor and its transmission located inside the wheel (3) hub, related with means of control activated by at least one skater's hand (u), and moved by a source of energy independent of type fuel in a tank, or of type electricity contained in a battery of accumulators, this propulsion organ of the wheel (3) itself constituting by its very weight a means enabling to increase the wheel (3) adherence.